

NOVEMBER/DECEMBER 2023

23PMA12 — REAL ANALYSIS — I

Time : Three hours

Maximum : 75 marks



SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Define bounded variation of a function on $[a, b]$.
2. Define rearrangements of series.
3. When do you say that Riemann- Stieltjes integral exists?
4. Define step function.
5. State second fundamental theorem of integral calculus.
6. State Bonnet's theorem.
7. Define double sequence.
8. Define double series.
9. What do you mean by uniform convergence of series of functions?
10. Define mean convergence of sequences of functions.

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions.

11. (a) State and prove the Dirichlet's test.
Or
(b) State and prove the Abel's test.
12. (a) State and prove the reduction of Riemann-Stieltjes integral to a finite sum.
Or
(b) State and prove the Euler's summation formula.
13. (a) State and prove first mean-value theorem for Riemann Stieltjes integrals.
Or
(b) State and prove second mean-value theorem for Riemann Stieltjes integrals.
14. (a) State and prove the Bernstein theorem.
Or
(b) State and prove Tauber's theorem.
15. (a) State and prove Weierstrass M-test.
Or
(b) State and prove Dirichlet test for uniform convergence.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. State and prove additive property of total variation.
17. State and prove any two linear properties of Riemann integral.
18. State and prove Lebesgue's criterion for Riemann-integrability.
19. State and prove the Mertens theorem.
20. State and prove Cauchy condition for uniform convergence of series.
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